

32. (Once Amended) The method of claim 30, wherein the inertial force is linear, the movement is bi-directional with respect to the housing, the movement being associated with the linear inertial force.

33. (Once Amended) The method of claim 30, wherein the mechanism includes a flexure having at least two flex joints.

REMARKS

Claims 8 and 17 have been cancelled. Claims 1-7, 9-16 and 18-33 have been amended. Accordingly, claims 1-7, 9-16 and 18-33 are pending in this application. Applicants respectfully submit that no new matter has been added. Entry and consideration of the foregoing amendments is respectfully requested.

Should the Examiner have any questions or comments concerning the above-identified amendment, please feel free to contact the undersigned at the phone number listed below.

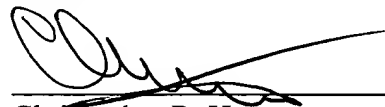
The Commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R. §§1.16, 1.17, and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 50-1283.

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APPENDIX

MARKED-UP VERSION OF CLAIMS

1. ~~A haptic feedback interface device in communication with a host computer implementing a host application program, said interface device manipulated by a user, the interface device~~An apparatus, comprising:

~~a device housing that is physically contacted by said user;~~

~~a sensor device detecting said~~coupled to the housing, the sensor configured to detect a manipulation of said interface device by said user, said sensor device outputting at least a portion of the housing and to output sensor signals representative associated with the manipulation of said manipulation~~the portion of the housing;~~

~~an actuator coupled to said device housing, said~~the housing, the actuator operative to output a~~configured to output a force; and a~~associated with the sensor signals; and

~~a first flex joint mechanism coupling said~~and a second flex joint each being coupled to the housing and the actuator to said device housing, said~~the first flex joint and the second flex joint mechanism allowing said~~configured to transfer the force output from the actuator to be moved with respect to said device housing, wherein said actuator acts as an inertial mass when in motion to provide an inertial force that is transmitted to said user, wherein said mechanism includes at least two separated portions, each of said portions coupled to a different portion of said actuator~~the housing to produce a haptic feedback.~~

2. ~~A haptic feedback interface device as recited in claim 1 where said actuator~~The apparatus of claim 1, wherein the force is a rotary force.

3. ~~A haptic feedback interface device as recited in~~The apparatus of claim 2,
~~wherein one~~the first flex joint~~of said separate portions of said mechanism is coupled to a rotating shaft of said~~the actuator, and another~~the second flex joint of said portions is coupled to a housing~~portion of said~~the actuator~~excluding the rotating shaft.

4. ~~A haptic feedback interface device as recited in~~The apparatus of claim 1, wherein ~~said~~the ~~force output by the~~ actuator is associated with an approximately linearly linear ~~movement~~motion with respect to ~~said device~~the housing to provide, the haptic feedback having a ~~linear inertial force, said movement caused by said force output by said~~direction associated with ~~the linear motion of the~~ actuator.

5. ~~A haptic feedback interface device as recited in~~The apparatus of claim 1, wherein ~~said~~the housing includes a substantially flat base configured to be in contact with a ~~support surface, the movement of the~~ actuator approximately linearly moves approximately ~~along a z-axis~~being ~~substantially perpendicular to an x-y plane in which said user can move a~~ manipulandum~~the substantially flat base of said interface device~~the housing.

6. ~~A haptic feedback interface device as recited in~~The apparatus of claim 1, wherein ~~said actuator is coupled to~~ the housing includes ~~a contact member such that when said~~ actuator is moved~~configured to be contacted by a user, said~~the contact member is moved, wherein ~~said user physically contacts said contact member in normal operation of said interface~~ ~~device, said contact member transmitting a contact force~~being coupled to the actuator and ~~configured to said user while said~~transmit the ~~inertial force is transmitted to said~~the user.

7. ~~A haptic feedback interface device as recited in~~The apparatus of claim 6, wherein ~~said~~the ~~contact member includes a cover portion of said interface device, said cover~~ ~~portion being at least a portion of a top surface of said interface device~~the housing.

9. ~~A haptic feedback interface device as recited in~~The apparatus of claim 8, wherein ~~one of said portions of said~~the first flex joint ~~flexure includes a rotating member coupled~~ ~~to said~~the housing by ~~at the first~~ flex joint.

10. ~~A haptic feedback interface device as recited in~~The apparatus of claim 9, wherein ~~one of said portions of said~~the first flex joint ~~flexure includes a collar coupled to a~~

~~housing of said~~the actuator and ~~a~~, the first flex joint couples coupling said~~the~~ collar to ~~said~~the housing.

11. ~~A haptic feedback interface device as recited in~~The apparatus of claim 1, wherein ~~said~~the actuator includes a rotating shaft having a range of motion, the first flex joint flexure includes at least one stop to ~~prevent rotation~~disposed within the range of a motion of rotating shaft of ~~said~~ actuator past a desired fraction of a full revolution.

12. ~~A haptic feedback interface device as recited in claim 1 wherein said~~The apparatus of claim 1, wherein ~~the~~ actuator is ~~moved~~configured to move with a bi-directionally to produce pulse and vibration sensations to ~~said~~ user, directional action, the force output from the actuator being associated with the bi-directional motion.

13. ~~A haptic feedback interface device as recited in~~The apparatus of claim 1, wherein ~~said interface device~~the housing is included within a handheld interface device.

14. ~~A haptic feedback interface device as recited in~~The apparatus of claim 1, wherein ~~said interface device~~the housing is included within a mouse.

15. ~~A~~The apparatus of claim 14, wherein ~~the haptic feedback interface device as recited in claim 14 wherein said inertial force is correlated~~configured to be associated with a graphical representation displayed by ~~said~~ host computer, wherein ~~a position of said mouse in said planar workspace corresponds with a position of a cursor displayed in said graphical representation.~~

16. ~~A haptic feedback interface device as recited in~~The apparatus of claim 1, further comprising a microprocessor, separate from ~~said~~ host computer, coupled to ~~said~~the sensor and to ~~said~~the actuator, ~~said~~the microprocessor ~~operative~~configured to receive host commands from ~~said~~ host computer and sensor signals from the sensor, output force signals to ~~said~~the actuator for ~~controlling said inertial force, associated with the haptic feedback and operative to receive~~

~~said sensor signals from said sensors, process said sensor signals, and report locative data to said host computer derived from said sensor signals and indicative of manipulation of said interface device.~~

18. ~~A haptic feedback interface device in communication with a host computer implementing a host application program, said interface device manipulated by a user, the interface device~~An apparatus, comprising:

~~a device housing that is physically contacted by said user;~~

~~a sensor device detecting said~~coupled to the housing, the sensor configured to detect a manipulation of said interface device by said user, said sensor device outputting at least a portion of the housing and to output sensor signals representative of said associated with the manipulation of the portion of the housing; and

~~an actuator assembly coupled to said device housing, said actuator assembly comprising: an actuator; and a flexure coupling said an actuator to said device assembly coupled to the housing, said flexure allowing said the actuator to be moved with respect to said device housing, wherein said assembly including an actuator acts as an inertial mass when in motion to provide an inertial force that is transmitted to said user a first flex joint and a second flex joint; wherein said flexure includes at least two separate portions, each of said portions coupled to said each being coupled to the actuator, and each of said portions including at least one flex joint, the actuator being configured to output an inertial force to the housing, the first flex joint and the second flex joint being configured to allow a movement of the actuator with respect to the housing.~~

19. ~~A haptic feedback interface device as recited in~~The apparatus of claim 18, wherein ~~said the inertial force output by said actuator is a rotary force, wherein one the first flex joint of said separate portions of said mechanism is coupled to a rotating shaft of said the actuator, and another of said portions the second flex joint is coupled to a housing remaining portion of said the actuator.~~

20. ~~A haptic feedback interface device as recited in~~The apparatus of claim 18, wherein ~~said the movement of the actuator is approximately linearly moved linear with respect to~~

~~said device~~ the housing to provide a linear, the inertial force, said movement caused by said force
output by ~~said~~ the actuator is approximately linear.

21. ~~A haptic feedback interface device as recited in~~ The apparatus of claim 18,
wherein ~~one~~ the first flex joint of said portions of said flexure includes a rotating member coupled
to ~~said~~ the housing by a flex joint.

22. ~~A haptic feedback interface device as recited in~~ The apparatus of claim 21,
wherein ~~one of said portions of said~~ the second flex joint flexure includes a collar coupled to a
housing of ~~said~~ the actuator and a flex joint coupling said collar to said housing.

23. ~~An actuator assembly for providing inertial sensations in a haptic feedback~~
~~interface device, the actuator assembly comprising:~~
an actuator, the actuator being configured to output haptic feedback; and
a flexure mechanism coupling ~~said~~ the actuator to said device's a housing, ~~said~~ the flexure
~~allowing~~ mechanism being said configured to allow a movement of the actuator to be moved with
respect to ~~said device~~ the housing, wherein said actuator is operative to act as an inertial mass
when in motion to provide an inertial force that is transmitted to a user of said haptic feedback
interface device, wherein said the flexure includes at least two separate portions mechanism
having a first portion and a second portion, each of said portions being coupled to said the
actuator, and each of said portions including at least one flex joint.

24. ~~A~~ The actuator assembly of claim 23, wherein the haptic feedback interface device
~~as recited in claim 23 wherein said force output by said actuator is~~ associated with a rotary force.

25. ~~A haptic feedback interface device as recited in claim 24~~ The actuator assembly of
claim 24, wherein one the first portion of said separate portions of said ~~mechanism~~ the flexure
mechanism is coupled to a rotating shaft of ~~said~~ the actuator, and another the second portion of
~~said~~ the portions flexure mechanism is coupled to a housing the remaining portion of ~~said~~ the
actuator.

26. ~~A haptic feedback interface device as recited in claim 23~~The actuator assembly of claim 23, wherein ~~said~~the movement of the actuator is approximately ~~linearly moved~~linear with respect to ~~said device~~the housing to provide a linear, ~~the~~ inertial force, ~~said movement caused by said force output by said~~the actuator is linear.

27. ~~A haptic feedback interface device as recited in claim 23~~The actuator assembly of claim 23, wherein ~~one~~the first portion of said portions of ~~said flexure~~the flexure mechanism includes a rotating member coupled to ~~said~~the housing by ~~a one of the at least one flex joint~~joints.

28. ~~A haptic feedback interface device as recited in claim 28~~The actuator assembly of claim 23, wherein ~~one~~the first portion of said portions of ~~said flexure~~the flexure mechanism includes a collar coupled to ~~a housing of said~~the actuator and a flex joint coupling saidthe collar to saidthe housing.

29. ~~A haptic feedback interface device as recited in claim 24~~The actuator assembly of claim 24, wherein ~~said~~the actuator is movedconfigured to move with a bi-directionallydirectional motion, the force output from the actuator being associated with the bi-directional motion to produce pulse and vibration sensations to said userhaptic feedback.

30. A method for providing inertial haptic sensations using ~~a haptic feedback interface device in communication with a host computer, said interface device manipulated by a user, the method comprising:~~

~~enabling~~detecting a detection of said manipulation of ~~said interface~~a device by said user,
~~said sensor device outputting;~~

sending sensor signals representative of ~~said~~associated with the manipulation; and

enabling an output of a force with actuator; and

causing saidoutputting an inertial force by a movement of an actuator ~~to be moved with respect to said device~~a housing using of the device, a mechanism ~~coupled between said actuator and a device housing, wherein said actuator acts as an inertial mass when in motion to provide an~~

~~inertial force that is transmitted to said user, wherein said mechanism includes~~including at least two ~~separated~~separate portions; each of said ~~portions~~being coupled to a different ~~portion of~~point on the actuator and the housing.

31. ~~A~~The method as ~~recited in~~of claim 3030, wherein said ~~the~~inertial force output by said ~~the~~actuator is a rotary force.

32. ~~A~~The method as ~~recited in~~of claim 3030, wherein said ~~actuator~~the inertial force is ~~approximately linearly moved~~linear, the movement is bi-directionallydirectional with respect to said ~~device~~the housing to provide a the movement being associated with the linear inertial force; ~~said movement caused by said force output by said actuator.~~

33. ~~A~~The method as ~~recited in~~of claim 3030, wherein said ~~the~~mechanism includes a flexure having at least two flex joints.